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ABSTRACT

Any theory of language acquisition must take into account the actual speech heard by children during the acquisition period. When 8 well-educated mothers were tape-recorded talking to their daughters, ages 16 to 30 months, it was found that their speech differed significantly from that spoken to another adult. The mothers used a more restricted vocabulary to their daughters, used pronouns differentially, spoke in distinct clausal units similar to written sentences, spoke in a higher median fundamental frequency, restricted their verb tense usage and talked mostly about the child. The speech to the children appeared to be a simpler, more grammatically "correct" version of English than that spoken to adults. (Author)

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Abstract

Any theory of language acquisition must take into account the actual speech heard by children during the acquisition period. When 8 well-educated mothers were tape-recorded talking to their daughters ages 16 to 30 months, it was found that their speech differed significantly from that to another adult. The mothers used a more restricted vocabulary to their daughters, used pronouns differentially, spoke in distinct clausal units similar to written sentences, spoke in a higher median fundamental frequency, restricted their verb tense usage and talked mostly about the child. The speech to the children appeared to be a simpler, more grammatically "correct" version of English than that spoken to adults.

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MATERNAL SPEECH TO CHILDREN DURING LANGUAGE ACQUISITION

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In middle class American homes, a child's primary source of language input is its mother. It is on the basis of what the child comprehends of its mother's speech that it formulates its first linguistic rules and eventually the rules with which it will interact with the linguistic community at large. As pointed out by Bever, Fodor and Wechsel (1965), adult speech to adults is notable for its false starts, rambling style and loose adherence to the grammatical rules set forth for the written form of English. Bever et al. (1965), Chomsky (1965, 1968) and McNeill (1970) have noted that adult-to-adult speech would provide a difficult language model for a child to formulate its grammatical rules on; Chomsky and McNeill then postulate highly specific innate mechanisms to aid the child. But is adult-to-child, specifically mother-to-child, speech the same as adult-to-adult speech?

The study presented here was undertaken in order to discover some of the possible differences between a mother's speech to her child and her speech to an adult in an interview situation. Previous work by Hess, e.g., Hess and Shipman (1965) with social class differences and Halverson and Waldrop (1970) with sex differences pointed to the necessity of adequate controls for these differences; this study used middle class mothers and female children. Differences were looked for in the mothers' speech between the two social situations, and, when they began appearing in the analysis, orderly differences

among the mothers' speech to their daughters were considered as pointing to possible signs of sensitivity to their child's speech production as opposed to a general speech-to-children.

Method

Eight mothers of first born females were chosen on the basis of availability and age of their children. The children ranged in age from 16 to 30 months at approximately two month intervals. The mothers were located in a University town, and they were, not surprisingly, white and well-educated (all had some college and four had or were working towards Master's degrees). The mothers were asked to tape 20 minutes of themselves and their child "doing what you usually do," to then listen to the tape and, about a day later, talk to the investigator about what they had heard (this conversation was also taped).

The tapes were transcribed and the mothers' utterances were classified by complete or incomplete clause structure. Complete clauses were then analyzed for use of connectives, pronouns, verb tense, negatives, and subjects. Both conditions (adult-to-adult [A-A] and adult-to child [A-C])were analyzed for words-per-minute by adult, type-token ratio, and average fundamental frequency. Comparisons were made between findings for A-C and A-A. Questions in A-C were categorized by the answers expected. Levels of language development of the children were assessed[2].

Results

Children's Language Development

The language development of the children was assessed by calculating their mean utterance length in morphemes. As can be seen in Table 1, the children 16 to 22 months of age (labeled A through D) were essentially limited to one word utterances. No child taped was in the pivotal stage of two word

utterances, bearing witness to the dangers of estimating developmental levels by chronological age. Since the order of levels of development is the same as that by age of child (noting the tie of the children of mothers E and F), data presented for developmental consideration will be in this order.

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Insert Table 1 about here

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A-A - A-C Differences

The mothers spent more time talking in A-A (adult-to-adult) than A-C (adult-to-child); they averaged 34.3 to 67.8 words per minute in A-C and 99.6 to 140.5 words per minute in A-A. Type-taken ratios were lower for A-C than A-A. As can be seen in Table 2, though there were wide individual differences in both groups, no value in A-C exceeded a value of A-A. This ratio indicates that the vocabulary of the mother is more restricted to her child than to an adult.

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Insert Table 2 about here

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Between 17% and 26% of the total number of words in both A-A and A-C were pronouns, and for 7 of the 8 mothers, pronoun usage was slightly less in A-C. Most noteworthy were the differences in references of the same pronouns (it, that, these, this, those, etc.) in A-A and A-C, and two special classes of referents were distinguished: those with physical referents, e.g., "where do you want it," and those without, e.g., "it's starting to rain," "it must be an age or something." The resulting analysis is presented in Table 3.

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Insert Table 3 about here

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Connectives such as "and," "because," "since," "but," and a lack of pause between utterances (the spoken equivalent of "run-together sentences") abounded in A-A, sometimes forming strings of 15 or more clauses; they were rare in A-C. Percentages of complete clauses with connective syntactic markers are shown in Table 4.

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Insert Table 4 about here

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Developmental Trends

The following findings also showed A-A - A-C differences; the A-C data additionally seemed to lend themselves to the possibility of developmental trends.

Spectrographic analyses were run on at least 13 utterances for each mother in A-A and A-C. The median fundamental frequency for all mothers was higher in A-C than A-A. The mothers of the younger children additionally had a greater range of frequencies, as measured by the difference between the 75th and 25th quartiles values, in A-C than A-A. See Figure 1. During the age range where the children were producing utterances with average morpheme length of between 2.5 and 3.0, there occurs a dramatic restriction in both median and range; for mothers E, F and G, the range is more restricted in A-C than A-A.

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Insert Figure 1 about here

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The proportion of questions in the different mothers' A-C materials ranged, with no seeming patterns, from 26% to 57% of the complete clauses (their occurrence in A-A was minimal due to the nature of the interview situation). In order to penetrate this functional aspect of the employment of

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question forms, the functional role played by questions in the particular interaction episodes, i.e., what kind of response was the mother apparently trying to solicit, was summarized. Five classes of functional roles were developed which could be imposed to encompass all of the questions, whether well-formed or not. 1) Some questions solicited no answer either because there was none or because the answer obviously required was beyond the capabilities of the child (e.g., "Why don't you come here?" requires no answer, and "How does that work?" is obviously beyond the capabilities of a child with a ten word vocabulary); this category is called no answer required. 2) Some questions were designed to elicit naming: "What is that?," "Can you say . . . ?". This category is called elicitation. 3) A certain number of questions, most often incomplete, functioned to elicit more information or at least a repetition of the previous utterance: "What?," "Hmm?," and "What did you say?" are examples of clarification. 4) Yes-No questions are those requiring just that: a "Yes" or "No" answer, e.g., "Is that a bunny?," "Do you want juice?" 5) Other questions required the child to give more information, ranging from a choice between two objects (e.g., "Do you want milk or juice?") to a full explanation (e.g., "What's this girl doing?"). This category is called explanation. The results of this analysis are presented in Figure 2, with each category shown as a percentage of the total number of questions asked by each mother. It can be seen that elicitation questions are most frequent in the mothers of children at the one-word utterance stage. Yes-no questions occur frequently in the speech of all mothers; it is interesting to note, however, that of the pooled total of 271 yes-no questions asked, only three clearly required a no answer, and one of these was answered incorrectly by the child.

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Insert Figure 2 about here

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The verbs of clauses were sorted into five tense categories on the basis of apparent speaker intention: (a) describing something that occurred in the past, (b) an ongoing event in the present, (c) something likely to occur in the future, (d) a conditional event requiring the imperfect tense, and (e) something that may have happened before and/or may occur in the future and is frequently used in conjunction with the "impersonal" you (here called continuity). A-A speech showed wide individual variation in occurrence of the forms with most clauses being accounted for by the past (4-30%) and present (56-87%) tenses. A-C speech seemed to show orderly variation among the mothers, with present tense accounting for 82-92% of clauses for mothers B-F, and 68-72% for mothers A, G, and H. See Figure 3.

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Insert Figure 3 about here

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Subjects of well-formed clauses were sorted into ten categories. "I" predominated in A-A (34-54%) with the child and subjects other than "you" or "I" accounting for the bulk of the remaining clauses (36-58%). In A-C, clauses with the child as subject were notable for the omission of a stated "you"; when the subject was "you," it was not stated from 16% to 63% of the time. This omission is especially important when the frequency of "you" statements is examined: as can be seen in Figure 4, mothers B through F used "you" as a stated or understood subject for 40% to 67% of their total complete clauses, and for these same mothers, the "you" was not stated 39% to 63% of the time. Thus, for the children of mothers B through F, from 16% to 35% of the total utterances they heard contained no stated subject. Mothers A, G, and H used "you" less frequently and also stated subjects with greater regularity. Mothers themselves were rarely the subject of their own clauses, though there

appears to be a notable increase in use of "I" for mothers G and H, possibly indicating increasing occurrence as children are older. See Figure 4.

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Insert Figure 4 about here

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Discussion

The speech produced by the mothers in this sample to their daughters was certainly different than that to the investigator. The mothers spoke less to their daughters, used a more restricted vocabulary, used pronouns differentially, spoke in dintinct clausal units similar to written sentences, spoke with a higher median fundamental frequency, restricted their verb tense usage and talked mostly about the child.

The fundamental frequency differences provide an adult counterpart to Lieberman's (1967) findings of differences in children's median fundamental frequency as a function of their listeners: the children spoke in the highest frequency to themselves, lower to their mother, and lowest to their father. The exaggerations in the range of fundamental frequency and subsequent restriction parallels the mothers' reports of at first increased attention of the child and later decreased understanding with high exaggeration (Remick, 1971).

The preponderance of required "yes" answers to yes-no questions puts severe limitations on the interpretation of the child's ability to comprehend this form of question in uncontrolled situations; they may simply be learning to answer "yes" to statements having a question intonation pattern. The mothers reported that their children were understanding them even though the protocols of the younger children clearly show this not to be the case (Remick, 1971). Evidently, when children first begin responding correctly to a few words and have a small vocabulary of their own, mothers tend to interpret

their children's actions as signifying complete understanding. It is only when the children are capable of fairly complex utterances (i.e., average morphemes per utterance greater than 3) that the mothers report an accurate awareness of their children's comprehension limitations.

McNeill (1970) discusses children's omission of subjects as reflecting their natural egocentrism. As can be seen in these results, the omission may simply reflect a modelling effect from the mothers' speech. In the mothers' speech the omissions can be seen to be redundant material: the child, objects in the environment or occasionally filler pronouns (e.g., sure is hot today) were omitted. According to David Crystal (personal communication), these same kinds of omissions are common in everyday speech between adults as well. There were no such omissions in the interview situation, but they should not be unexpected where there is a high degree of shared information (e.g., objects both persons are looking at or handling, subjects often talked about) and informality.

The mothers could also be expected to simplify and/or abbreviate their speech in an effort to reduce their utterances to only the most salient information for the child. As was seen, for example, not only with subjects of clauses, verb tense was restricted by the mothers whose children were speaking only simple utterances (1 to 2 1/2 average morphemes per utterance); these children were not producing the past tense (except for an occasional irregular form) and showed little sign of comprehending it. Likewise, the frequency of the child as subject of utterances would seem to take into account the children's egocentricity.

The mothers' use of questions functioned as a teaching device; the answers required the child to respond in action or speech to the limits of her capacity. While the child was in the holophrastic utterance stage, the mother asked,

"What's that?" Only with the oldest three children did the mothers ask, "Why?" or questions requiring a choice ("Do you want milk or coke?") with any regularity and with any possibility of an answer. The mothers seemed to be engaging in direct tutelage of their children much of the time.

Care should be taken in generalizing these results: probably only first born or well spaced children in middle and upper class nuclear families interact so intensively with their mothers. Remick (1973) has found changes in speech by middle class Mexican mothers to be very similar to those reported here. On the other hand, American ghetto Black (Slobin 1968) and Mexican Indio (Remick, 1973) mothers report being uncomfortable talking in a one-to-one situation with their children and have little to say; in these groups as much language socialization is done by other children as by mothers, and little of it is in the nature of directed tutelage.

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Footnotes

1. This paper is based on a doctoral dissertation submitted to the University of California, Davis. The author wishes to thank Dr. Jarvis Bastian, thesis director, and Chris Kister and Pat Kline for their help. Research equipment for this work was paid for by Grant No. DG 15 from the University of California Patent Fund. Author's current address: Psychology Department, California State College, Turlock, California 95380.
2. Detailed methodology is available from the author upon request.

TABLE 1

Levels of Language Development[a]

	CHILD							
	A	B	C	D	E	F	G	H
Age in months	17	18	20	22	25	26	28	30
Mean utterance length in morphemes	--	1.14	1.19	1.29	2.37	2.37	2.88	3.56

a. Based only on understandable utterances. The investigator's ability to comprehend was close to that of the mothers.

TABLE 2

Type-Token Ratio[a]

Interaction	Mother A	B	C	D	E	F	G	H
A-C	5.03	5.96	6.07	5.17	5.25	5.42	6.12	6.25
A-A	7.10	6.89	6.37	7.61	6.31	6.98	6.95	6.32

a. Computed with a correction for uneven sample sizes by the formula

type-token ratio = (no. of types)// $\sqrt{2x \text{ (no. of tokens)}}$

TABLE 3

"It" Pronouns as Percentage of Total Number of Pronouns

	Mother							
Interactions and Referents	A	B	C	D	E	F	G	H
A-C								
Physical referent	40.0	18.7	19.9	42.3	42.9	9.0	23.1	25.6
No physical referent	7.2	6.1	9.6	6.5	5.6	6.0	7.2	3.2
A-A								
Physical referent	4.4	3.3	0.4	4.4	0.0	0.3	0.3	0.8
No physical referent	14.7	23.8	23.8	25.7	28.0	21.0	20.5	16.3

TABLE 4

Percentage Complete Clauses With Connective Syntactic Markers

	Mother							
Interaction	A	B	C	D	E	F	G	H
A-C	14.5	17.2	21.3	15.3	9.0	22.9	34.6	32.6
A-A	70.2	75.0	53.2	65.7	59.9	67.8	79.0	81.0

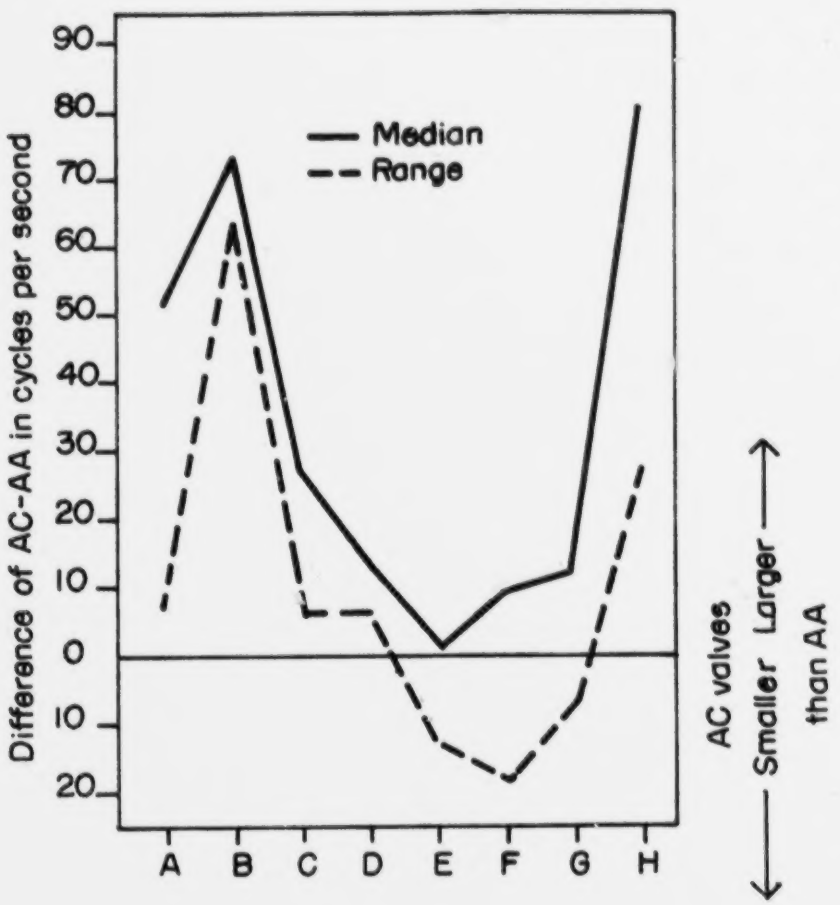
FIGURE CAPTIONS

Fig. 1. Median fundamental frequencies considered by the difference between A-C and A-A values. Range from the 25th to 75th quartile considered by the differences between A-C and A-A values. Both measures in cycles per second.

Fig. 2. The A-C questions of the mother are shown by what type of answer she expected as a percentage of the total number of questions asked by that mother. Includes complete and incomplete forms of questions.

Fig. 3. Percentage of complete clauses in the past and present verb tenses.

Fig. 4. The mother as "I" or "Mommy" and the child as "you" (stated or understood) as percentage of all well-formed clauses.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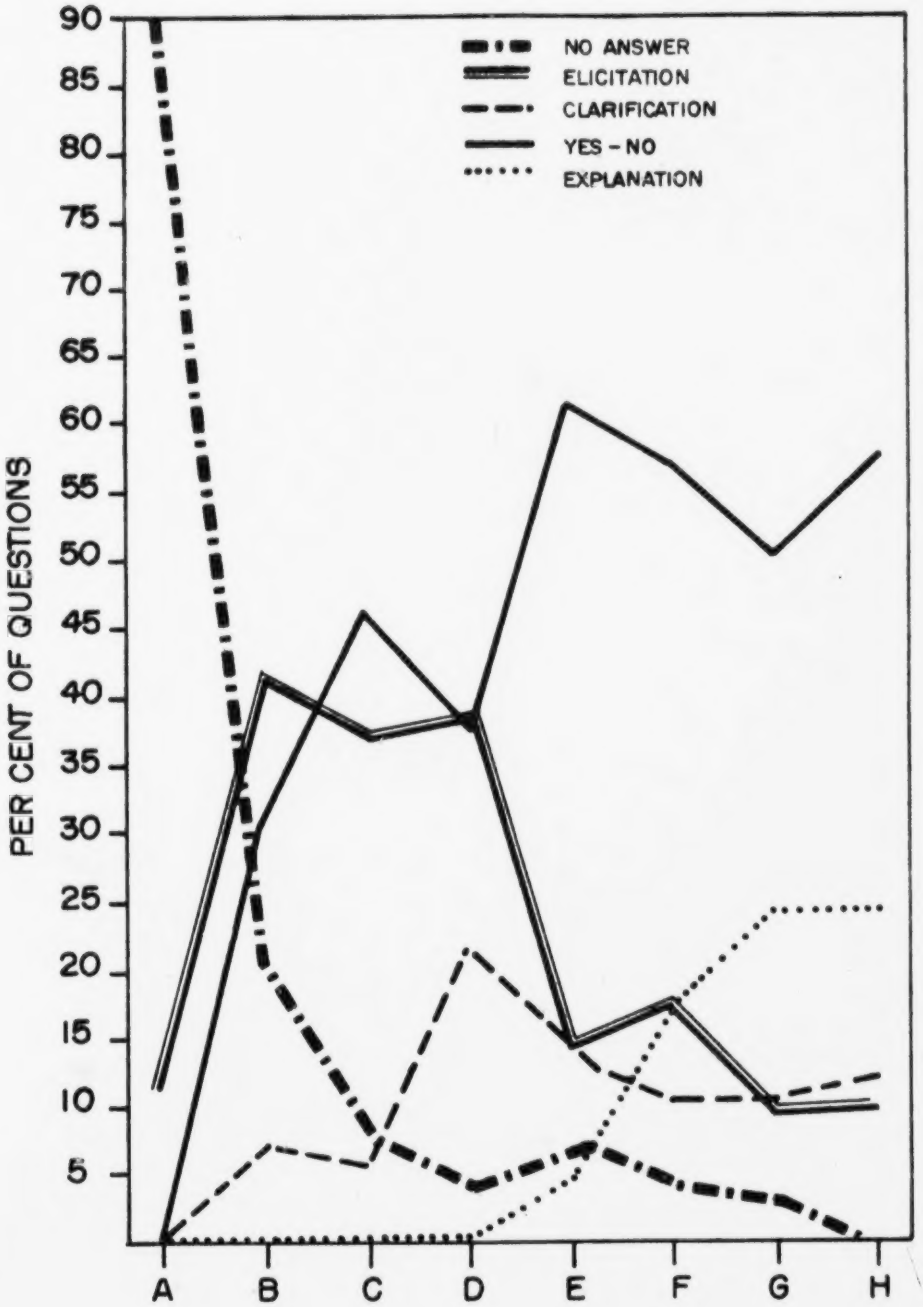
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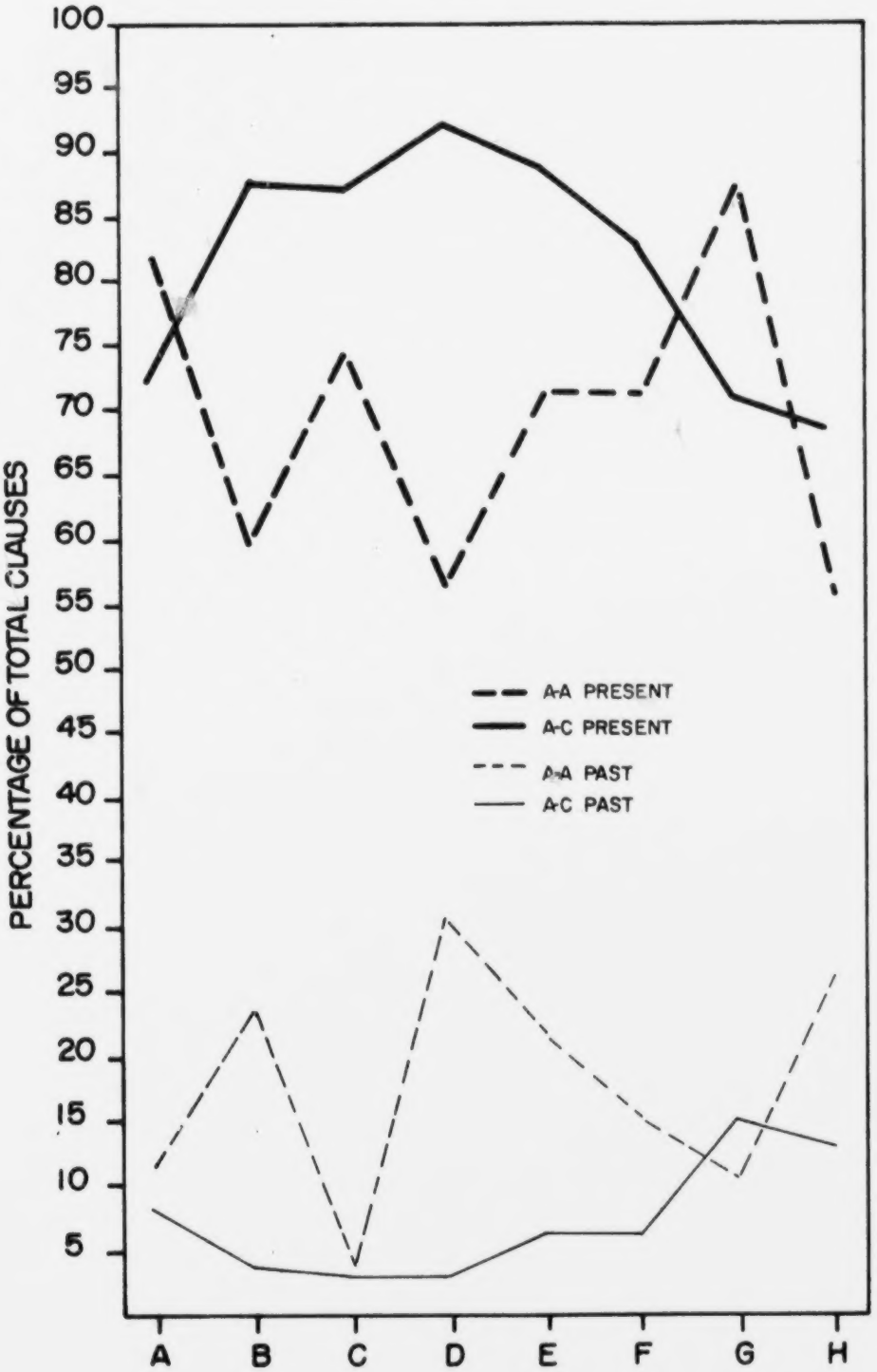
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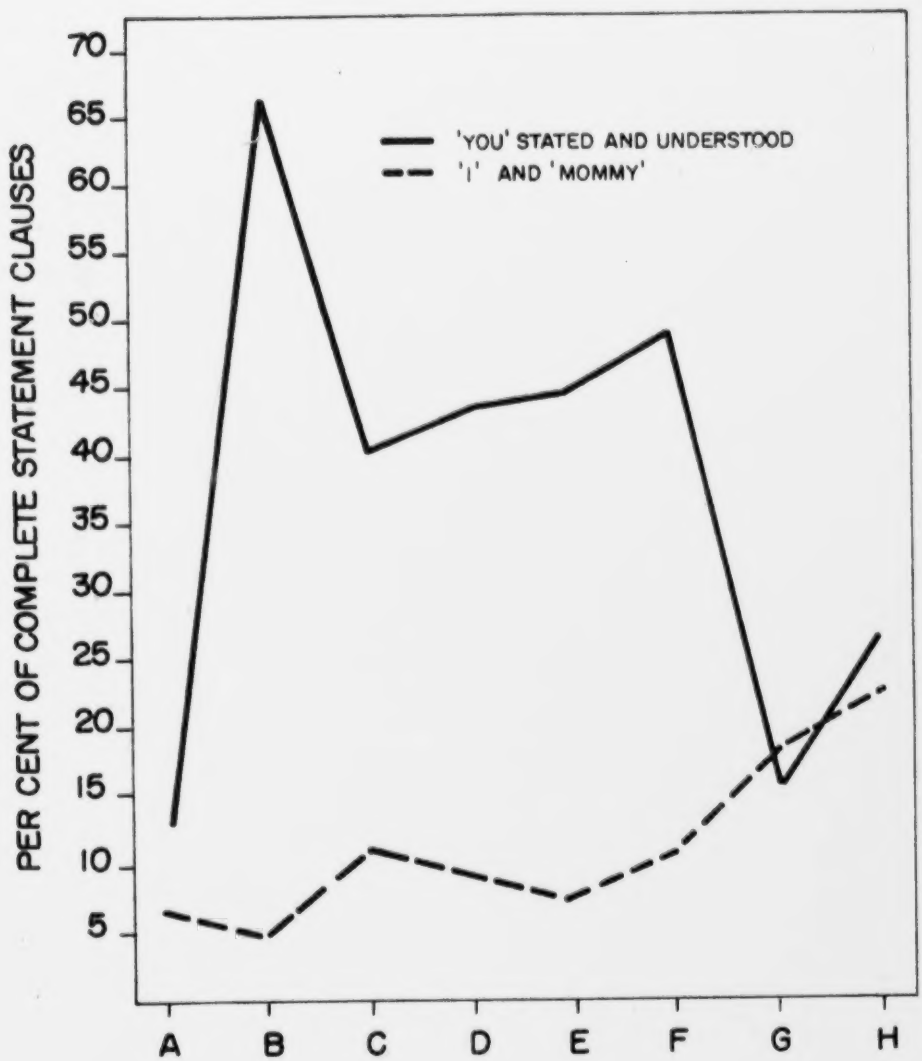
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'I' AND 'MOMMY'
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